

REMARKS:

Claims 1, 3-4, 6-7 and 9 are pending in the present application. Claim 2 has been cancelled without prejudice or disclaimer.

The Office Action objects to the entry of the previous amendment of “source major unit” in claims 1 and 2 as not being properly marked. Claims 1 and 2 have been properly marked to indicate that the intended claim language is “source and measure unit.” Applicants respectfully request withdrawal of this objection.

Claims 1 and 2 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hinds in view of Sobelewski. This rejection is moot as to claim 2, which has been cancelled. The Office Action concedes that Hinds does not teach a source and measure unit, nor does it teach a test head controller that controls the source and measure unit. However, the Office Action asserts that Sobelewski shows a source and measure unit. The Office Action further asserts that preamp 12 of Sobelewski is a controller that controls the source and measure unit. Applicants respectfully assert that the combination of Hinds and Sobelewski fail to disclose each of the elements of claim 1.

Claim 1 is directed to a capacitance measurement system having an external controller that is connected to a test head and controls a test head controller, wherein the test head controller controls the source and measure unit, the capacitance measurement unit, and the switch matrix. As conceded by the Office Action, Hinds fails to disclose a test head controller that controls the source and measure unit. Similarly, Sobelewski fails to disclose a test head controller that controls the source and measure unit.

Sobelewski is directed to a bi-directional current scaling preamplifier that is inserted between a device under test and a source measure unit or a source measure unit and switching matrix combination as shown in FIG. 2:

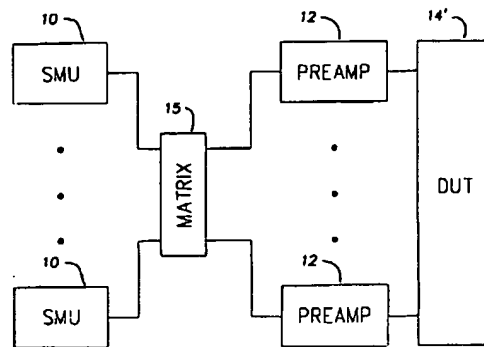


FIG. 2

The Sobelewski preamp 12 is merely an amplifier that increases accuracy in measuring very small currents, e.g., on the order of picoamperes:

The preamplifier 12 can be made small enough to be located close to the DUT 14, even when there are many of them (e.g., 10-20). By having the preamplifier 12 scale up the current from the DUT 14, the detrimental effects of long cables and/or switching matrixes between the DUT and the SMU can be minimized. If, for example, the current is scaled up to 100 microamperes, the effects of stray capacitance and dielectric absorption of charge carriers from the cables and matrixes can be neglected. At the same time, the preamplifier 12 can be working with DUT currents in, for example, the range of picoamperes. (Sobelewski col. 2, lines 3-13).

The Sobelewski pre-amplifier 12 is bi-directional and increases measuring precision through amplification of the current supplied to it via SMU 10 and matrix 15 when the SMU is forcing a voltage and measuring a current or when the SMU is forcing a current and measuring a voltage. (Sobelewski col. 4, lines 18-24).

The Sobelewski pre-amplifier 12 is not a controller that controls the source and measure unit. Sobelewski does not disclose or suggest that the pre-amplifier 12 is doing anything more than amplification. Moreover, the Sobelewski pre-amplifier 12 has no means, e.g., communication lines, for providing control over the SMU 10. The

Sobelewski pre-amplifier 12 is merely connected in circuit with SMU 10 and DUT 14 for amplification of the current. As such, claim 1 is not obvious over the combination of Hinds and Sobelewski.

Claims 3-4 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hinds in view of Sobelewski and further in view of Andeen.

Claims 3-4 and 7 depend from claim 1 and include the feature of an external controller that is connected to a test head and controls a test head controller, wherein the test head controller controls the source and measure unit, the capacitance measurement unit, and the switch matrix. As described above, both Hinds and Sobelewski fail to disclose or suggest this feature of claim 1. Similarly, Andeen fails to describe this feature.

Andeen describes a capacitance measuring device and method including a ratio transformer, a reference capacitor(s), and multiplying digital to analog converters connected to form a bridge, with the converter being adjustable to at least partially balance the bridge and the bridge includes a phase shifter and reference capacitors to balance the real part of the unknown impedance. (Andeen Abstract). The Office Action relies upon Andeen asserting that it discloses transmission of absolute value and phase of impedance of the device. Andeen does not disclose or suggest the feature of claims 3-4 and 7 of an external controller that is connected to a test head and controls a test head controller, wherein the test head controller controls the source and measure unit, the capacitance measurement unit, and the switch matrix.

Claims 6 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hinds in view of Sobelewski and further in view of Kitayoshi.

Claims 6 and 9 depend from claim 1 and include the feature of an external controller that is connected to a test head and controls a test head controller, wherein the test head controller controls the source and measure unit, the capacitance measurement

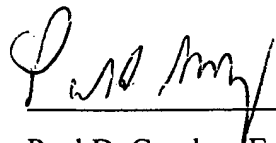
unit, and the switch matrix. As described above, both Hinds and Sobelewski fail to disclose or suggest this feature of claim 1. Similarly, Kitayoshi fails to describe this feature.

Kitayoshi describes an impedance and transfer characteristic measuring apparatus that produces sine-wave and cosine-wave data by accumulating a fixed phase value in synchronism with a clock signal and the sine-wave data is provided to a device under test after D-A conversion. (Kitayoshi Abstract). The Office Action relies upon Kitayoshi asserting that it discloses transmission of a real part and an imaginary part of an impedance of the device. Kitayoshi does not disclose or suggest the feature of claims 6 and 9 of an external controller that is connected to a test head and controls a test head controller, wherein the test head controller controls the source and measure unit, the capacitance measurement unit, and the switch matrix.

In view of the foregoing, Applicants respectfully submit that all claims presented in this application patentably distinguish over the prior art. Accordingly, Applicants respectfully request favorable consideration and that this application be passed to allowance.

Respectfully submitted,

12/22/05
Date


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